A New Physical Sign for the Detection of Small Pleural Effusions

EUGENE EISENBERG, M.D.
San Francisco

A PHYSICAL SIGN of small pleural effusions that has not been described previously was discovered in five patients attending a clinic for the treatment of advanced cancer of the breast. The sign consists of a sudden change in breath sounds at mid-inspiration. In each instance attention was first attracted by finding the level of diaphragmatic dullness at a higher level than had been noted previously. The level of dullness still moved down one or two interspaces between full expiration and inspiration. No other signs of pleural fluid or atelectasis were detectable. When the diaphragm of the stethoscope was placed at the level of diaphragmatic dullness at the end of expiration and the patient breathed in deeply, breath sounds were heard only faintly or not at all during the first half of inspiration. At mid-inspiration clear breath sounds suddenly became audible and were heard for the duration of the inspiratory movement. When the patient leaned forward, normal breath sounds could be heard throughout the inspiratory phase of respiration.

This sign was detected in five patients during a nine-month period when the author was personally caring for 88 patients with advanced cancer of the breast. In each instance no other physical signs of fluid could be elicited. In routine x-ray examinations, the fluid assumed the shape of the diaphragm in three of the five patients. In the other two, the presence of fluid was obvious in roentgenograms. Confirmation was obtained in all five patients by lateral decubitus roentgenograms and removal of 100 to 250 ml of fluid by thoracentesis.

Roentgenograms of the chest of one of the five patients taken two weeks after the sign was first detected are shown in Figures 1 and 2. In the two-week interval, additional fluid had accumulated, but the "break-through" breath sound was still present. The degree of movement of the fluid level between full inspiration and expiration can be seen in the posterior-anterior projection (Figure 1). In full inspiration, the position used for routine roentgenograms, the fluid level on the right assumed the shape of the diaphragm. This evidently occurs when the base of the lung retains its concave shape and overrides the fluid.

When a small amount of free fluid lies between the lung and the diaphragm without producing atelectasis, descent of the diaphragm causes the fluid level to move downward. As the fluid descends, it

From the Department of Medicine, University of California School of Medicine.

Supported by a grant (Ca-03489) from the United States Public Health Service.

Submitted July 27, 1964.

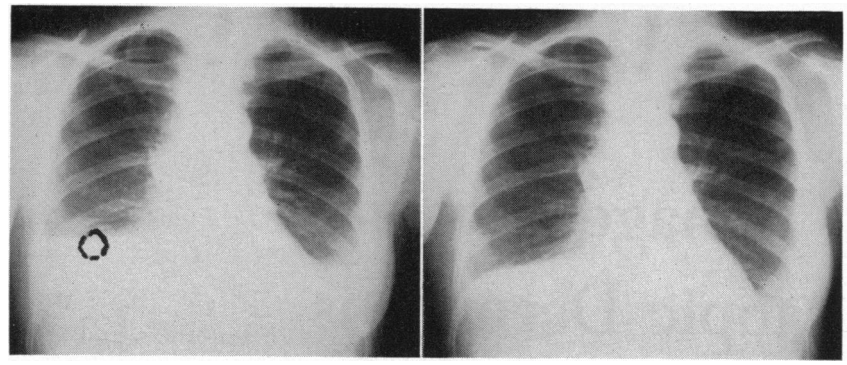

Figure 1.—Roentgenograms showing posterior-anterior view in full expiration (left) and full inspiration (right). The positioning of the chest piece of the stethoscope to elicit the "break-through" breath sound is shown by the dotted circle. Note that the fluid level assumes the shape of the diaphragm during inspiration.

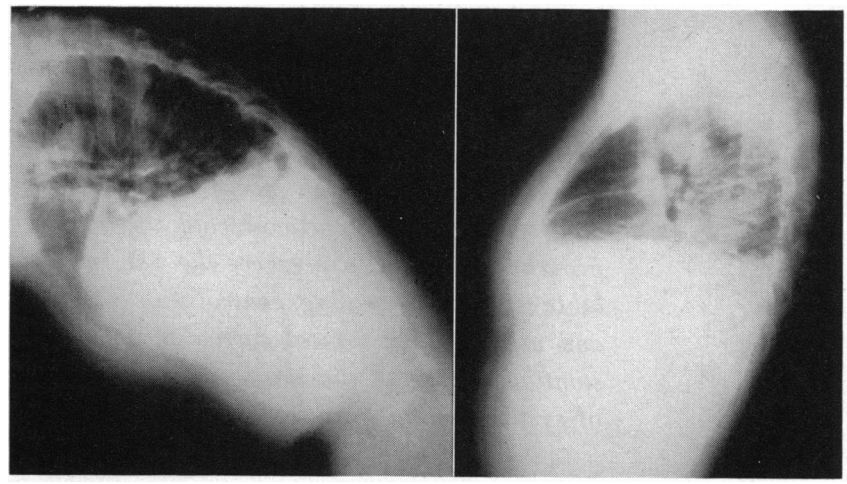

Figure 2. — Lateral projection showing that when the patient bends forward the fluid gravitates forward, uncovering the posterior lung and eliminating the "break-through" breath sound.

is followed by aerated lung. If the physician places the chest piece of the stethoscope just below the "high-water level," he will hear no breath sounds, or only faint ones, after which normal breath sounds will become audible. Such a relationship between the fluid level, position of the chest piece and change in breath sounds was confirmed by combined auscultation and fluoroscopic examination in two patients. The change in the posterior fluid level when the patient bends forward is shown in the lateral projection (Figure 2).

This sign probably will not be encountered frequently. Its occurrence obviously depends on the presence of a certain amount of free fluid in association with only slight pleural inflammation and no atelectasis. When it is encountered, the sudden change in breath sounds during inspiration is quite striking. The clinician who is aware of the significance of the "break-through" breath sound should find it useful in the detection of small pleural effusions when the usual signs cannot be elicited.

Department of Medicine, U.C. School of Medicine, San Francisco, California 94122.